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Job Stress and Burnout in Hospital Employees: Comparison of Different Medical Professions in a Regional Hospital in Taiwan

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ABSTRACT

Objectives: To explore the prevalence and attributing factors of burnout among five different medical professions in a regional teaching hospital.

Design: Cross-sectional study.

Setting: Hospital-based survey.

Participants: A total of 1,329 medical professionals were recruited in a regional hospital with a response rate of 89%. These voluntary participants included 101 physicians, 68 physician assistants, 570 nurses, 216 medical technicians and 374 administrative staff.

Primary and secondary outcome measures: Demographic data included gender, age, level of education, marital status, and work situations, such as position, work hours, work shifts, were obtained from electric questionnaire. Job strain and burnout were measured by two validated questionnaires, the Chinese version of the Job Content Questionnaire and the Copenhagen Burnout Inventory.

Results: Among the five medical professions, the prevalence of high work-related burnout from highest to lowest was nurses (66%), physician assistants (61.8%), doctors (38.6%), administrative staff (36.1%) and medical technicians (31.9%), respectively. Hierarchical regression analysis indicated that job strain, over-commitment and low social support explained the most variance (32.6%) of burnout.

Conclusions: Physician assistant is an emerging high burnout group; their severity is similar to nurses and far more than doctors, administrative staff and medical technicians. These findings may contribute to the development of feasible strategies to reduce the stress which results in the burnout currently plaguing most hospitals in Taiwan.

Keyword: Job strain, Burnout, Medical professions

ARTICLE SUMMARY

Article focus

- To study the prevalence and influencing factors of burnout in different medical professionals who work together as a team in hospitals.

Key messages

- The study shows that the prevalence of high work-related burnout from highest to lowest was nurses, physician assistants, doctors, administrative staff and medical technicians.
- The study also indicates that age, work hours, job strain, over-commitment and social support were significantly related to burnout.

Strengths and limitations of this study

- This is the first report to compare burnout conditions among most of the medical professions in a hospital setting; large sample size and high response rate also strengthen the power of this study.
- Stressful life events, work-family conflicts and copying style of stress were not analyzed in this study.

Introduction

Medical practice is stressful. This is because medical personnel must respond to the needs of patients and families very quickly. However, medical knowledge and procedures usually include limitations and uncertainties. Any medical errors or mistakes may be costly, may be harmful to a patient's life, and are sometimes irreversible. Moreover, night work, shift work and long work hours are also very common in medical professions.

A great deal of research has indicated that long term exposure to job-related stress can lead to burnout.[1 2] Freudenberger[3] first used the term "burnout" to describe the gradual emotional depletion, loss of motivation, and reduced commitment among volunteers who worked for drug abuser. After three decades, burnout has been defined as a psychological syndrome that may emerge when employees are exposed to a stressful working environment with high job demands and low resources.[4 5] At the outset, burnout was reported most predominantly among human service workers. In the modern society, job stress and burnout are important issues for health care professionals. Burnout not only endangers their health and well-being, but also is associated with higher medical errors and suboptimal quality of care.[6-8]

There has been a lot of research on burnout in nurses, presumably because of the intense nature of their contact with patients or clients. Gray-Toft and Anderson [9]

have indicated seven fundamental stressors among nursing staff. These included the death and suffering of patients, conflict with doctors, inadequate training, lack of social support, conflicts with other nurses, excessive workload, and uncertainty about a treatment given. Similarly, a high prevalence of burnout among physicians has also been reported from various countries, for different specialists.[10-13] The potential sources of physician burnout are time pressure, delayed gratification, limited control and a loss of autonomy, conflict between career and family, feelings of isolation, as well as research and teaching activities.[8 14] Although many studies have discussed the stress and burnout situation for doctors and nurses, there has been no research on other medical professions beyond doctors and nurses who work together as a team in hospitals.

This study is aimed at an investigation and comparison of the prevalence of job stress and burnout among different medical professions within a hospital setting. Another aim is to explore the influencing factors that contribute to burnout across these professions. We hope these findings can facilitate the development of effective strategies of stress reduction programs in the hospitals.

Methods

Participants and study design

The medical professionals used as the sample in this study were recruited from a regional teaching hospital in Tainan, Taiwan. The five medical professions included in the survey were doctor, nurse, physician assistant, medical technician, and administrative staff. After reading the informed consent, all the voluntary participants completed an electronic questionnaire on the Training and Management System of the hospital from the first day of February through the end of March, 2012. Finally, 1,329 participants finished the questionnaire, and the response rate was 89%. The study was approved by the Ethics Review Board of the regional hospital.

Questionnaire

The questionnaire used in the study included socio-demographic information, working conditions, level of burnout and job stress, lifestyle behaviors, as well as medical history. Socio-demographic information included gender, age, educational level, and marital status. Working conditions included length of employment at current position, working hours per week, whether or not participants were doing shift work. Lifestyle factors included hours of sleep every night, healthy diet per week (≧ 5 servings of vegetable and fruits per day), time spent on physical activities per week, and smoking status.

Burnout

The newly developed Copenhagen Burnout Inventory (CBI) by Kristensen, et al.

[15] is a more straightforward measurement of burnout in the population of medical professionals as compared to the standard Maslach Burnout Inventory (MBI).[16] The CBI assesses burnout status using three dimensions: personal burnout, work-related burnout, and client-related burnout.

In this research, the burnout status was assessed by a Chinese version of the Copenhagen Burnout Inventory (C-CBI) which was constructed based on the CBI with good validity and reliability.[17] [18] The C-CBI consists of 16 items: personal burnout accounts for 5 items, work-related burnout accounts for 5 items, and client-related burnout accounts for 6 items. All items used a Likert-type, five-response category scale. The responses were re-scaled to a 0–100 metric. In this survey, the questionnaire had a Cronbach's α coefficient for each dimension of 0.93, 0.93, and 0.92, respectively. A high burnout score $\geqq$ 50 indicates high burnout in the analysis.

Job stress

We also included the qualified Chinese version of the Job Content Questionnaire (C-JCQ), which was derived from Karasek's demand-control-support model to measure job strain, because this model has been considered one of the dominant tools for measuring job stress.[18] This model was highly associated with hypertension and intima-media thickness of carotid artery[19-21] and was also correlated well to coronary heart disease in a recent published paper. [22] A total of 25 items are

included, with psychological work demands, 9 items; job control, 8 items; supervisor support, 4 items; and coworker support, 4 items. Each item of the inventory was measured on a 4-point scale (strongly agree to strongly disagree). A subscale of "over-commitment" specified by Siegrist was also included in our questionnaire.[23 24] The measurement of over-commitment was based on 5 items on a 5 point Likert scale. The Cronbach's α coefficient for the dimension of demand, control, supports and over-commitment in this study were 0.47, 0.64, 0.87, and 0.83, respectively.

Statistical analysis:

Demographic data including gender, age, level of education, marital status, and work situations such as position, work hours, work shifts were recorded as number and percentages. One-way ANOVA (analysis of variance) was used for the analysis of burnout according to the socio-demographic information, profession, work conditions and level of job strain. Correlation analysis was performed to analyze the relationships among independent variables influencing burnout in order to avoid a multi-collinearity problem in the multiple regression analysis (not shown in the result). Multiple regression analysis for different models was performed to identify the factors influencing work-related burnout. All calculations were performed using a software SPSS v. 17, with the level of significance set at $p < 0.05$.

Results

Characteristics of the participants

The socio-demographic factors, job characteristics and medical profession information are summarized in Table 1. The participants were female dominant (82.8%). The majority age group was 30-39 years, and the mean age across subjects was 38.3 years. Most medical professionals were married (62.5%) and graduated with a 4-year university degree (83.1%) at the time of study. More than half of the participants work overtime routinely, and nearly half of the medical professions worked in shifts.

Factors associated with burnout

Table 2 shows that females had significantly higher burnout scores than males in personal and work-related burnout but not in the client-related burnout. Older staff had significantly lower burnout scores than younger staff on the three dimensions of burnout. Participants who graduated from a college had lower burnout scores than those who graduated from high school or graduate school. Among medical professions, nurses and physician assistants had the top two highest burnout scores among the three dimensions. With regard to job strain, active and high strain perception was characterized by a significantly higher degree of burnout than was the case for those who perceived their level of strain as passive or low. Frequency of

over-commitment was positively correlated with the score of all three dimensions of burnout. Finally, lower social support was negatively correlated with the three burnout scores.

Predictors of worked-related burnout

The results of multiple regression analysis of predicting variables to work-related burnout are shown in Table 3. Model 1 demonstrated that gender and age, but not level of education, or marital status had a significantly correlation to burnout. In Model 2, working overtime and working in shifts had additional effects with regard to burnout. When putting on medical professions into Model 3, it was indicated that nurses and physician assistants had significantly higher burnout than the other three medical professions, and gender effects were thus insignificant. In the full model (Model 4), those who perceived with high or active job strain had much higher burnout than those with low and passive strain. Professionals who sometimes/often over-commit were demonstrated to have higher levels of burnout than those who indicated that they never or seldom over-commit. Finally, professionals with low social support had significantly higher burnout. Among these factors, job strain, over-commitment, and social support demonstrated remarkable association with work-related burnout, which could explain 30.1% of variance in burnout.

Burnout and job stressors among medical professions

In Table 4, nurses are shown to have the highest prevalence of high burnout among medical professions. The next highest were the physician assistants, with a severity of burnout very similar to that of nurses. Physicians, medical technicians and administrative staff had similar burnout conditions on the personal and work related dimensions, but physicians had more severity of client-related burnout than the other professions, with the exception of nurses.

Compared with the other professions, nurses as a group had the characteristics of youngest age, highest percentage of females (99.5%), most engaged in shift work (74%), as well as most perceiving active and high strain. Physician assistants as a group had the highest over-commitment (44.1%) and lowest support (60.3%). They were also characterized as having a high percentage of females, long work hours, and many experienced active and high strain. Doctors as a group had the features of being the oldest on average and had the highest percentage of longer work hours (48.5%). Medical technicians and administrative staff had a similar percentage of female members, social support, longer work hours, and those testing for active and high strain (26.4%, 24.9%).

Discussion

This study investigated the prevalence of burnout among different medical professions and examined the influencing factors related to burnout. Our findings showed that being young, working overtime, being a nurse and physicians assistants, engaged in a job with active and high strain, frequent over-commitment and low social support were associated with high burnout. Above all, the three variables of job strain, over-commitment and lack of social support explained most of the variance related to burnout.

To our knowledge, this is the first report to compare most of the medical professions in a hospital setting. The advantages of large sample size and high response rate also strengthen the power of this study. The results indicated that nurses have the highest burnout scores as compared to the other medical professions, which is consistent with a previous report.[25] The mean burnout score and percentage of high burnout in nurses (60.1 and 73.2% in this study) was shown to be much higher than other studies using similar instruments.[15 16 26] The primary cause of stress for hospital staff came from the preparation of hospital accreditation, and the second cause of stress was the threat of medical malpractice lawsuits.[25] This reason may partially explain the high burnout in Taiwan's medical professionals. In addition, Heinen, et al. [27] reported that high burnout is consistently associated with nurse's intention to leave

their profession. This seems to be a vicious cycle. Therefore, Taiwan's nurses have a high workload and lack of adequate staffing for periods of times which they describe as being "trapped in hell".[28]

The second group most susceptible to burnout is physician assistants. Their burnout scores and prevalence of high burnout were very close to nurses. The possible reason for this is that physician assistants have been recruited due to a shortage of resident physicians in most of Taiwan's hospitals since 1994.[29] Most of them had graduated from college or above, had 2-4 years of clinical experience and had received a half-year of additional training. Their routine work is to assist attending physicians to care for patients and complete medical records. Most of the time, physician assistants may face emergent and critical conditions of patients and make immediate responses. This is really a big challenge in their work. In our analysis, physician assistants had a higher percentage of influencing factors toward burnout than doctors had, which included being female, of younger age, experiencing high or active job strain, over-commitment and low social support.

The unanticipated result in this study is that the burnout scores of doctors were very close to those of medical technicians and administrative staff. The mean burnout score and prevalence of high burnout in doctors in this study were 43.3 and 41.6%. These data are very close to scores from Mongolian doctors but higher than those

found in Danish doctors, Australian dentists and other occupations in Taiwan.[15 16 26 30 31]

Although this study has some strength, there are still several limitations that need to be addressed. First, our participants were from a single regional hospital; therefore, it is not possible to generalize the conclusions for medical professions across the whole of Taiwan's hospitals. Therefore, the design for further study can expand to include more institutions. Second, stressful life events and work-family conflicts, which may affect the outcome of burnout, as found in other studies, were not examined in this research. Finally, this study was conducted with a cross-sectional design; therefore, the limitation of weak causal inference is inherent. A longitudinal follow up the employee's stressor and burnout condition are necessary to improve these relationships in the future.

We conclude that nurses and physician assistants suffered from the highest burnout as compared to doctors, administrative staff, and medical technicians in the hospital setting selected for this study. Also, a job with active and high strain, frequent feelings of over-commitment as well as working without superintendent and coworker support resulted in the highest percentages of burnout. The above findings may facilitate the development of feasible and rational strategies to design and implement stress reduction programs in hospitals.

Contributorship Statement

All authors participated in the interpretation of data, wrote and critically reviewed the paper.

Li-Ping Chou: designed and conducted the study, and wrote the draft.

Chung-Yi Li: statistical consultant, who revised and interpreted the tables.

Susan C. Hu: advised the whole study and completed the manuscript.

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Conflict of interest

The authors declare that there is no conflict of interest.

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Tables

Table 1

Characteristics of participants (N=1329)

Factors	N	%
Gender		
Male	228	17.2
Female	1101	82.8
Age		
<30	209	15.7
30~39	602	45.3
40~49	378	28.4
≧50	139	10.5
Education		
High school	135	10.2
College/university	1105	83.1
Graduate school	89	6.7
Marital Status		
Single	499	37.5
Married	830	62.5
Profession		
Physician	101	7.6
Physician assistant	68	5.1
Nurse	570	42.9
Medical technician	216	16.3
Administrative staff	374	28.1
Work hours(weekly)		
Normal (≦44 hours)	472	35.5
Overtime (>44 hours)	857	64.5
Work shifts		
No	684	51.5
Yes	645	48.5

Table 2

Analysis of burnout score according to socio-demographic, profession, and job stressors (n=1329)

Variable	Personal burnout		Work-related burnout		Client-related burnout	
	Mean±SD	*p-value*	Mean±SD	*p-value*	Mean±SD	*p-value*
Gender		<.001		<.001		.296
Male	43.2±20.0		40.9±20.0		37.4±18.9	
Female	53.9±21.4		49.4±21.1		38.8±18.9	
Age		<.001		<.001		<.001
<30	56.7±22.9		55.0±23.0		42.8±20.1	
30~39	54.7±21.2		49.9±20.6		39.4±18.8	
40~49	48.7±21.5		44.7±20.5		37.3±17.8	
≧50	42.8±17.0		37.6±17.4		31.8±18.1	
Educational level		<.05		<.05		.353
High school	55.7±21.9		50.5±21.9		40.8±18.9	
College/university	51.0±21.6		47.3±21.1		38.3±18.8	
Graduate school	58.0±21.2		52.2±21.9		38.6±19.3	
Marital status		.299		.078		<.05
Single	52.8±21.9		49.3±21.6		39.9±18.9	
Married	51.6±21.3		47.2±20.9		37.7±18.8	
Profession		<.001		<.001		<.001
Physician	43.3±18.6		41.5±19.0		38.6±16.7	
Physician assistant	58.7±20.7		54.7±21.9		41.1±17.7	
Nurse	60.1±20.8		55.8±21.1		42.9±19.1	
Medical technician	43.9±19.1		39.5±17.4		32.9±18.4	
Administrative staff	45.5±20.2		41.5±19.2		34.6±17.9	
Work hours (weekly)		<.001		<.001		<.001
Normal (≦44 hours)	49.6±20.7		40.1±19.0		34.3±18.2	
Overtime (>44 hours)	60.4±22.3		52.3±21.1		40.9±18.8	
Work shifts		<.001		<.001		<.001
Fixed shift	48.4±20.8		44.3±20.2		36.7±18.6	
In shift	55.8±21.7		51.9±21.6		40.5±18.9	
Job strain		<.001		<.001		<.001
Low strain	42.7±18.7		38.6±18.5		34.5±16.9	

Passive	46.3±18.1		42.5±16.9		34.3±16.7	
Active	61.9±20.6		55.6±19.6		42.3±19.3	
High strain	67.9±19.3		65.4±20.1		48.7±20.2	
Over-commitment		<.001		<.001		<.001
Never/seldom (0-25)	33.8±17.4		29.9±18.2		25.7±15.5	
Sometimes (26~50)	46.1±17.9		42.3±17.0		35.6±16.3	
Often/always (≧51)	65.8±19.8		61.4±20.2		46.5±19.9	
Social support		<.001		<.001		<.010
Low (<24)	55.9±21.5		53.0±21.6		40.4±20.1	
High (≧24)	49.6±21.2		45.0±20.4		37.5±18.1	

Table 3

Multiple regression analysis of factors associated with work-related burnout (n=1329)

Variables	Model 1 β (95%C.I.)	Model 2 β (95%C.I.)	Model 3 β (95%C.I.)	Model 4 β (95%C.I.)
Gender				
Male	0	0	0	0
Female	5.2(2.1~8.2)**	5.4(2.4~8.4)***	0.6(-2.9~4.0)	.849(-1.9~3.6)
Age				
≧50	0	0	0	0
40~49	6.1(2.0~10.1)**	6.1(2.1~10.0)**	4.6(0.7~8.6)*	3.8(0.7~7.0)*
30~39	10.3(6.4~14.2)***	8.8(4.9~12.6)***	6.1(2.2~10.0)**	6.5(3.4~9.7)***
<30	15.3(10.7~19.9)***	12.6(8.1~17.2)***	9.1(4.5~13.7)***	10.3(6.5~13.9)***
Educational level				
High school	0	0	0	0
College/university	-2.0(-5.8~1.7)	-2.9(-6.5~0.7)	-1.7(-5.2~1.9)	-0.8(-3.6~2.1)
Graduate school	2.2(-3.3~7.7)	0.7(-4.7~6.1)	1.3(-3.9~6.7)	0.4(-3.8~4.6)
Marital status				
Married	0	0	0	0
Single	0.8(-1.6~3.1)	1.0(-1.2~3.3)	1.4(-0.8~3.6)	0.2(-1.6~1.9)
Work hours (weekly)				
Normal (≦ 44hours)		0	0	0
Overtime (>44hours)		9.7(7.1~12.3)***	7.8(5.2~10.5)***	2.9(0.7~5.1)**
Work shift				
Fixed shift		0	0	0
In shift		4.8(2.6~7.1)***	1.9(-0.5~4.3)	0.7(-1.2~2.7)
Profession				
Medical technician			0	0
Administrative staff			3.7(0.3~7.0)*	1.9(-0.7~4.6)

Physician			1.4(-3.8~6.7)	4.1(-0.1~8.3)
Physician assistant			12.7(7.3~18.2)***	6.6(2.2~11.0)**
Nurse			12.9(9.6~16.3)***	7.7(4.9~10.4)***
Job strain				
Low strain				0
Passive				1.6(-0.6~3.9)
Active				7.5(4.8~10.1)***
High strain				16.1(13.4~18.7)***
Over-commitment				
Never/seldom (0~25)				0
Sometimes (26~50)				10.5(7.6~13.4)**
Often/Always (≧51)				24.9(21.8~28.0)***
Social support				
High (≧24)				0
Low (<24)				6.4(4.5~8.2)***
R^2	.064	.116	.160	.461
Adjust R^2	.059	.110	.152	.453

*p <0.05, **p <0.01, ***p <0.001

Model 1 adjusted for gender, age, education, and marriage.

Model 2 adjusted for variables of model 1 with additional adjustment for work hours and work shift.

Model 3 adjusted for variables of Model 2 and profession.

Model 4 adjusted for variables of Model 3 with additional adjustment for job strain, over-commitment, and social support.

Table 4

Distribution of age, gender, job stressors and burnout among medical professions (N=1329)

Variables	Physician	Physician assistant	Nurse	Medical technician	Administrators	p-value
	n=101	n=68	n=570	n=216	n=374	
High burnout (%)						
Personal burnout (≧50)	41.6	69.1	73.2	42.6	45.5	<.001
Work-related burnout (≧50)	38.6	61.8	66.0	31.9	36.1	<.001
Client-related burnout (≧50)	36.6	33.8	43.3	22.2	26.2	<.001
Job stressor						
Active/high strain (%)	25.7	41.2	50.0	26.4	24.9	<.001
Over-commitment (often, %)	30.7	44.1	43.7	24.1	31.8	<.001
Social support (low, %)	28.7	60.3	37.0	37.0	38.2	<.001
Work overtime (>44hours, %)	48.5	44.1	29.1	9.7	9.6	<.001
Work shift (in shift, %)	46.1	29.4	74.0	38.0	21.1	<.001
Age (mean±SD)	45.3±7.5	38.4±4.8	33.9±6.5	37.9±8.1	42.3±8.6	<.001
Gender (female, %)	16.8	91.2	99.5	75.0	78.3	<.001

Table 1

Characteristics of participants (N=1329)

Factors	N	%
Gender		
Male	228	17.2
Female	1101	82.8
Age		
<30	209	15.7
30~39	602	45.3
40~49	378	28.4
≧50	139	10.5
Education		
High school	135	10.2
College/university	1105	83.1
Graduate school	89	6.7
Marital Status		
Single	499	37.5
Married	830	62.5
Profession		
Physician	101	7.6
Physician assistant	68	5.1
Nurse	570	42.9
Medical technician	216	16.3
Administrative staff	374	28.1
Work hours(weekly)		
Normal (≦44 hours)	472	35.5
Overtime (>44 hours)	857	64.5
Work shifts		
No	684	51.5
Yes	645	48.5

Table 2

Analysis of burnout score according to socio-demographic, profession, and job stressors (n=1329)

Variable	Personal burnout		Work-related burnout		Client-related burnout	
	Mean±SD	*p-value*	Mean±SD	*p-value*	Mean±SD	*p-value*
Gender		<.001		<.001		.296
Male	43.2±20.0		40.9±20.0		37.4±18.9	
Female	53.9±21.4		49.4±21.1		38.8±18.9	
Age		<.001		<.001		<.001
<30	56.7±22.9		55.0±23.0		42.8±20.1	
30~39	54.7±21.2		49.9±20.6		39.4±18.8	
40~49	48.7±21.5		44.7±20.5		37.3±17.8	
≧50	42.8±17.0		37.6±17.4		31.8±18.1	
Educational level		<.05		<.05		.353
High school	55.7±21.9		50.5±21.9		40.8±18.9	
College/university	51.0±21.6		47.3±21.1		38.3±18.8	
Graduate school	58.0±21.2		52.2±21.9		38.6±19.3	
Marital status		.299		.078		<.05
Single	52.8±21.9		49.3±21.6		39.9±18.9	
Married	51.6±21.3		47.2±20.9		37.7±18.8	
Profession		<.001		<.001		<.001
Physician	43.3±18.6		41.5±19.0		38.6±16.7	
Physician assistant	58.7±20.7		54.7±21.9		41.1±17.7	
Nurse	60.1±20.8		55.8±21.1		42.9±19.1	
Medical technician	43.9±19.1		39.5±17.4		32.9±18.4	
Administrative staff	45.5±20.2		41.5±19.2		34.6±17.9	
Work hours (weekly)		<.001		<.001		<.001
Normal (≦44 hours)	49.6±20.7		40.1±19.0		34.3±18.2	
Overtime (>44 hours)	60.4±22.3		52.3±21.1		40.9±18.8	
Work shifts		<.001		<.001		<.001
Fixed shift	48.4±20.8		44.3±20.2		36.7±18.6	
In shift	55.8±21.7		51.9±21.6		40.5±18.9	
Job strain		<.001		<.001		<.001
Low strain	42.7±18.7		38.6±18.5		34.5±16.9	

Passive	46.3±18.1		42.5±16.9		34.3±16.7	
Active	61.9±20.6		55.6±19.6		42.3±19.3	
High strain	67.9±19.3		65.4±20.1		48.7±20.2	
Over-commitment		<.001		<.001		<.001
Never/seldom (0-25)	33.8±17.4		29.9±18.2		25.7±15.5	
Sometimes (26~50)	46.1±17.9		42.3±17.0		35.6±16.3	
Often/always (≧51)	65.8±19.8		61.4±20.2		46.5±19.9	
Social support		<.001		<.001		<.010
Low (<24)	55.9±21.5		53.0±21.6		40.4±20.1	
High (≧24)	49.6±21.2		45.0±20.4		37.5±18.1	

Table 3

Multiple regression analysis of factors associated with work-related burnout (n=1329)

Variables	Model 1 β (95%C.I.)	Model 2 β (95%C.I.)	Model 3 β (95%C.I.)	Model 4 β (95%C.I.)
Gender				
Male	0	0	0	0
Female	5.2(2.1~8.2)**	5.4(2.4~8.4)***	0.6(-2.9~4.0)	.849(-1.9~3.6)
Age				
≧50	0	0	0	0
40~49	6.1(2.0~10.1)**	6.1(2.1~10.0)**	4.6(0.7~8.6)*	3.8(0.7~7.0)*
30~39	10.3(6.4~14.2)***	8.8(4.9~12.6)***	6.1(2.2~10.0)**	6.5(3.4~9.7)***
<30	15.3(10.7~19.9)***	12.6(8.1~17.2)***	9.1(4.5~13.7)***	10.3(6.5~13.9)***
Educational level				
High school	0	0	0	0
College/university	-2.0(-5.8~1.7)	-2.9(-6.5~0.7)	-1.7(-5.2~1.9)	-0.8(-3.6~2.1)
Graduate school	2.2(-3.3~7.7)	0.7(-4.7~6.1)	1.3(-3.9~6.7)	0.4(-3.8~4.6)
Marital status				
Married	0	0	0	0
Single	0.8(-1.6~3.1)	1.0(-1.2~3.3)	1.4(-0.8~3.6)	0.2(-1.6~1.9)
Work hours (weekly)				
Normal (≦44hours)		0	0	0
Overtime (>44hours)		9.7(7.1~12.3)***	7.8(5.2~10.5)***	2.9(0.7~5.1)**
Work shift				
Fixed shift		0	0	0
In shift		4.8(2.6~7.1)***	1.9(-0.5~4.3)	0.7(-1.2~2.7)
Profession				
Medical technician			0	0
Administrative staff			3.7(0.3~7.0)*	1.9(-0.7~4.6)
Physician			1.4(-3.8~6.7)	4.1(-0.1~8.3)
Physician assistant			12.7(7.3~18.2)***	6.6(2.2~11.0)**
Nurse			12.9(9.6~16.3)***	7.7(4.9~10.4)***
Job strain				
Low strain				0

Passive				1.6(-0.6~3.9)
Active				7.5(4.8~10.1)***
High strain				16.1(13.4~18.7)***
Over-commitment				
Never/seldom (0~25)				0
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Social support				
High (≧24)				0
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R^2	.064	.116	.160	.461
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Work shift (in shift, %)	46.1	29.4	74.0	38.0	21.1	<.001
Age (mean±SD)	45.3±7.5	38.4±4.8	33.9±6.5	37.9±8.1	42.3±8.6	<.001
Gender (female, %)	16.8	91.2	99.5	75.0	78.3	<.001

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Job Stress and Burnout in Hospital Employees: Comparisons of Different Medical Professions in a Regional Hospital in Taiwan

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ABSTRACT

Objectives: To explore the prevalence and associated factors of burnout among five different medical professions in a regional teaching hospital.

Design: Cross-sectional study.

Setting: Hospital-based survey.

Participants: A total of 1,329 medical professionals were recruited in a regional hospital with a response rate of 89%. These voluntary participants included 101 physicians, 68 physician assistants, 570 nurses, 216 medical technicians and 374 administrative staff.

Primary and secondary outcome measures: Demographic data included gender, age, level of education, marital status, and work situations, such as position, work hours, work shifts, were obtained from electric questionnaire. Job strain and burnout were measured by two validated questionnaires, the Chinese version of the Job Content Questionnaire and the Copenhagen Burnout Inventory.

Results: Among the five medical professions, the prevalence of high work-related burnout from highest to lowest was nurses (66%), physician assistants (61.8%), physicians (38.6%), administrative staff (36.1%) and medical technicians (31.9%), respectively. Hierarchical regression analysis indicated that job strain, over-commitment and low social support explained the most variance (32.6%) of burnout.

Conclusions: Physician assistant is an emerging high burnout group; their severity is similar to nurses and far more than physicians, administrative staff and medical technicians. These findings may contribute to the development of feasible strategies to reduce the stress which results in the burnout currently plaguing most hospitals in Taiwan.

Keyword: Job strain, Burnout, Medical professions

ARTICLE SUMMARY

Article focus

- To study the prevalence and correlating factors of burnout in different medical professionals who work together as a team in hospitals.

Key messages

- The study shows that the prevalence of high work-related burnout from highest to lowest was nurses, physician assistants, physicians, administrative staff and medical technicians.
- The study also indicates that age, work hours, job strain, over-commitment and social support were significantly related to burnout.

Strengths and limitations of this study

- This is the first report to compare burnout conditions among most of the medical professions in a hospital setting; large sample size and high response rate also strengthen the power of this study.
- Stressful life events, work-family conflicts and copying style of stress were not analyzed in this study.

Introduction

Medical practice is stressful. This is because medical personnel must respond to the needs of patients and families very quickly. However, medical knowledge and procedures usually include limitations and uncertainties. Any medical errors or mistakes may be costly, may be harmful to a patient's life, and are sometimes irreversible. Moreover, night work, shift work and long work hours are also very common in medical professions.

A great deal of research has indicated that long term exposure to job-related stress can lead to burnout.[1, 2] Freudenberger[3] first used the term "burnout" to describe the gradual emotional depletion, loss of motivation, and reduced commitment among volunteers who worked for drug abuser. After three decades, burnout has been defined as a psychological syndrome that may emerge when employees are exposed to a stressful working environment with high job demands and low resources.[4, 5] At the outset, burnout was reported most predominantly among human service workers. In the modern society, job stress and burnout are important issues for health care professionals. Burnout not only endangers their health and well-being, but also is associated with higher medical errors and suboptimal quality of care.[6-8]

There has been a lot of research on burnout in nurses, presumably because of the intense nature of their contact with patients or clients. Gray-Toft and Anderson[9] have

indicated seven fundamental stressors among nursing staff. These included the death and suffering of patients, conflict with physicians, inadequate training, lack of social support, conflicts with other nurses, excessive workload, and uncertainty about a treatment given. Similarly, a high prevalence of burnout among physicians has also been reported from various countries, for different specialists.[10-13] The potential sources of physician burnout are time pressure, delayed gratification, limited control and a loss of autonomy, conflict between career and family, feelings of isolation, as well as research and teaching activities.[8,14]

Although many studies have discussed the stress and burnout situation for physicians and nurses, there has been no research on other medical professions, such as physician assistants, medical technicians and administrative staff, who work together as a team in hospitals. In particular, physician assistants have been recruited in most hospitals in Taiwan. They work together with physicians for direct patient care but their stress and burnout situation have not been reported yet.

This study is aimed at an investigation and comparison of the prevalence of job stress and burnout among different medical professions within a hospital setting. Another aim is to explore the associated factors that contribute to burnout across these professions. We hope these findings can facilitate the development of effective strategies of stress reduction programs in the hospitals.

Methods

Participants and study design

The medical professionals used as the sample in this study were recruited from a regional teaching hospital in Tainan, Taiwan. The five medical professions included in the survey were doctor, nurse, physician assistant, medical technician, and administrative staff. After reading the informed consent, all the voluntary participants completed an electronic questionnaire on the Training and Management System of the hospital from the first day of February through the end of March, 2012. Finally, 1,329 participants finished the questionnaire, and the response rate was 89%. The study was approved by the Ethics Review Board of the regional hospital.

Questionnaire

The questionnaire used in the study included socio-demographic information, working conditions, level of burnout and job stress, lifestyle behaviors, as well as medical history. Socio-demographic information included gender, age, educational level, and marital status. Working conditions included length of employment at current position, working hours per week, whether or not participants were doing shift work. Lifestyle factors included hours of sleep every night, healthy diet per week (≧ 5 servings of vegetable and fruits per day), time spent on physical activities per week,

and smoking status.

Burnout

The newly developed Copenhagen Burnout Inventory (CBI) by Kristensen, et al. [15] is a more straightforward measurement of burnout in the population of medical professionals as compared to the standard Maslach Burnout Inventory (MBI).[16] The CBI assesses burnout status using three dimensions: personal burnout, work-related burnout, and client-related burnout.

In this research, the burnout status was assessed by a Chinese version of the Copenhagen Burnout Inventory (C-CBI) which was constructed based on the CBI with good validity and reliability.[17, 18] The C-CBI consists of 16 items: personal burnout accounts for 5 items, work-related burnout accounts for 5 items, and client-related burnout accounts for 6 items. All items used a Likert-type, five-response category scale. The responses were re-scaled to a 0–100 metric. In this survey, the questionnaire had a Cronbach's α coefficient for each dimension of 0.93, 0.93, and 0.92, respectively. A high burnout score $\geqq$ 50 indicates high burnout in the analysis.

Job stress

We also included the qualified Chinese version of the Job Content Questionnaire (C-JCQ), which was derived from Karasek's demand-control-support model to measure job strain, because this model has been considered one of the

dominant tools for measuring job stress.[19] This model was highly associated with hypertension and intima-media thickness of carotid artery[20-22] and was also correlated well to coronary heart disease in a recent published paper.[23] A total of 25 items are included, with psychological work demands, 9 items; job control, 8 items; supervisor support, 4 items; and coworker support, 4 items. Each item of the inventory was measured on a 4-point scale (strongly agree to strongly disagree). A subscale of "over-commitment" specified by Siegrist was also included in our questionnaire.[24, 25] The measurement of over-commitment was based on 5 items on a 5 point Likert scale. The Cronbach's α coefficient for the dimension of demand, control, supports and over-commitment in this study were 0.47, 0.64, 0.87, and 0.83, respectively.

Statistical analysis:

Demographic data including gender, age, level of education, marital status, and work situations such as position, work hours, work shifts were recorded as number and percentages. One-way ANOVA (analysis of variance) was used for the analysis of burnout according to the socio-demographic information, profession, work conditions and level of job strain. Correlation analysis was performed to analyze the relationships among independent variables influencing burnout in order to avoid a multi-collinearity problem in the multiple regression analysis (not shown in the result). Multiple regression analysis for different models was performed to identify the factors

influencing work-related burnout. All calculations were performed using a software SPSS ver. 17, with the level of significance set at $p < 0.05$.

Results

Characteristics of the participants

The socio-demographic factors, job characteristics and medical profession information are summarized in Table 1. The participants were female dominant (82.8%). The majority age group was 30-39 years, and the mean age across subjects was 38.3 years. Most medical professionals were married (62.5%) and graduated with a 4-year university degree (83.1%) at the time of study. More than half of the participants work overtime routinely, and nearly half of the medical professions worked in shifts.

Factors associated with burnout

Table 2 shows that females had significantly higher burnout scores than males in personal and work-related burnout but not in the client-related burnout. Older staff had significantly lower burnout scores than younger staff on the three dimensions of burnout. Participants who graduated from a college had lower burnout scores than those who graduated from high school or graduate school. Among medical professions, nurses and physician assistants had the top two highest burnout scores

among the three dimensions. With regard to job strain, active and high strain perception was characterized by a significantly higher degree of burnout than was the case for those who perceived their level of strain as passive or low. Frequency of over-commitment was positively correlated with the score of all three dimensions of burnout. Finally, lower social support was negatively correlated with the three burnout scores.

Predictors of worked-related burnout

The results of multiple regression analysis of predicting variables to work-related burnout are shown in Table 3. Model 1 demonstrated that gender and age, but not level of education, or marital status had a significantly correlation to burnout. In Model 2, working overtime and working in shifts had additional effects with regard to burnout. When putting on medical professions into Model 3, it was indicated that nurses and physician assistants had significantly higher burnout than the other three medical professions, and gender effects were thus insignificant. In the full model (Model 4), those who perceived with high or active job strain had much higher burnout than those with low and passive strain. Professionals who sometimes/often over-commit were demonstrated to have higher levels of burnout than those who indicated that they never or seldom over-commit. Finally, professionals with low social support had significantly higher burnout. Among these factors, job strain,

over-commitment, and social support demonstrated remarkable association with work-related burnout, which could explain 30.1% of variance in burnout.

Burnout and job stressors among medical professions

In Table 4, nurses are shown to have the highest prevalence of high burnout among medical professions. The next highest were the physician assistants, with a severity of burnout very similar to that of nurses. However, physicians, medical technicians and administrative staff had similar burnout conditions on the personal and work related dimensions, but physicians had more severity of client-related burnout than the other professions, with the exception of nurses.

Compared with the other professions, nurses as a group had the characteristics of youngest age, were nearly females (99.5%), most engaged in shift work (74%), as well as had the highest percentage (27.9%) perceiving high strain. Physician assistants as a group had the highest over-commitment (44.1%) and lowest support (60.3%). They were also characterized as having a high percentage of females (91.2%), long work hours, and the second highest percentage (27.2%) experiencing high strain. Physicians as a group had the features of being the oldest on average and had the highest percentage of longer work hours (48.5%) but very few perceived high strain (2.0%). Medical technicians and administrative staff had a similar percentage of

female members, social support, longer work hours, and those testing for high strain (14.4%, 14.7%).

Discussion

This study investigated the prevalence of burnout among different medical professions and examined the associated factors related to burnout. Our findings showed that being young, working overtime, being a nurse and physician assistants, engaged in a job with high strain, frequent over-commitment and low social support were associated with high burnout. Above all, the three variables of job strain, over-commitment and lack of social support explained most of the variance related to burnout.

To our knowledge, this is the first report to compare most of the medical professions in a hospital setting. The advantages of large sample size and high response rate also strengthen the power of this study. The results indicated that nurses have the highest burnout scores as compared to the other medical professions, which is consistent with a previous report.[26] The mean burnout score and percentage of high burnout in nurses (60.1 and 73.2% in this study) was shown to be much higher than other studies using similar instruments.[8, 15, 16, 27, 28] The primary cause of stress for hospital staff came from the preparation of hospital accreditation, and the second

cause of stress was the threat of medical malpractice lawsuits.[26] This reason may partially explain the high burnout in Taiwan's medical professionals. In addition, Heinen, et al.[29] reported that high burnout is consistently associated with nurse's intention to leave their profession. This seems to be a vicious cycle. Therefore, Taiwan's nurses have a high workload and lack of adequate staffing for periods of times which they describe as being "trapped in hell".[30]

The second group most susceptible to burnout is physician assistants (also called clinical nurse specialist after 2000).[31] Their burnout scores and prevalence of high burnout were very close to nurses. The possible reason for this is that physician assistants have been recruited due to a shortage of resident physicians in most of Taiwan's hospitals since 1994.[31] Most of them had graduated from college or above, had 2-4 years of clinical experience and had received a half-year of additional training. Their routine work is to assist attending physicians to care for patients and complete medical records. Most of the time, physician assistants may face emergent and critical conditions of patients and make immediate responses. This is really a big challenge in their work. In our analysis, physician assistants had a higher percentage of related factors toward burnout than physicians had, which included being female, of younger age, experiencing high strain, over-commitment and low social support.

The unanticipated result in this study is that the burnout scores of physicians

were very close to those of medical technicians and administrative staff. The mean burnout score and prevalence of high burnout in physicians in this study were 43.3 and 41.6%. These data are very close to scores from Mongolian physicians but higher than those found in Danish physicians, Australian dentists and other occupations in Taiwan.[15, 16, 26, 32, 33]

Although this study has some strength, there are still several limitations that need to be addressed. First, our participants were from a single regional hospital; therefore, it is not possible to generalize the conclusions for medical professions across the whole of Taiwan's hospitals. Therefore, the design for further study can expand to include more institutions. Second, stressful life events and work-family conflicts, which may affect the outcome of burnout, as found in other studies, were not examined in this research. Finally, this study was conducted with a cross-sectional design; therefore, the limitation of weak causal inference is inherent. A longitudinal follow up the employee's stressor and burnout condition are necessary to improve these relationships in the future.

We conclude that nurses and physician assistants suffered from the highest burnout as compared to physicians, administrative staff, and medical technicians in the hospital setting selected for this study. Also, a job with high strain, frequent feelings of over-commitment as well as working without superintendent and coworker

support resulted in the highest percentages of burnout. The above findings may facilitate the development of feasible and rational strategies to design and implement stress reduction programs in hospitals.

For example, the results showed burnout to be higher in younger individuals, as well as in those who work overtime, perceive high strain, and in those who frequently over-commit or receive low social support. Therefore, we suggest that the target group of stress reduction programs should focus on younger professionals first and the intervention strategies must cover individual/group and environmental levels. The former includes communication skill training, stress and time management, and senior-junior support groups, etc. The later includes suitable worksheet, reasonable welfare, and healthy working environment, etc.

Data sharing

No additional data available.

Contributorship

All authors participated in the interpretation of data, wrote and critically reviewed the paper.

Li-Ping Chou: designed and conducted the study, and wrote the draft.

Chung-Yi Li: statistical consultant, who revised and interpreted the tables.

Susan C. Hu: advised the whole study and completed the manuscript.

Conflict of interest

The authors declare that there is no conflict of interest.

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Table 1

Characteristics of participants (N=1329)

Factors	N	%
Gender		
Male	228	17.2
Female	1101	82.8
Age		
<30	209	15.7
30~39	602	45.3
40~49	378	28.4
≧50	139	10.5
Education		
High school	135	10.2
College/university	1105	83.1
Graduate school	89	6.7
Marital Status		
Single	499	37.5
Married	830	62.5
Profession		
Physician	101	7.6
Physician assistant	68	5.1
Nurse	570	42.9
Medical technician	216	16.3
Administrative staff	374	28.1
Work hours(weekly)		
Normal (≦44 hours)	472	35.5
Overtime (>44 hours)	857	64.5
Work shifts		
No	684	51.5
Yes	645	48.5

Table 2

Analysis of burnout score according to socio-demographic, profession, and job stressors (n=1329)

Variable	Personal burnout		Work-related burnout		Client-related burnout	
	Mean±SD	*p-value*	Mean±SD	*p-value*	Mean±SD	*p-value*
Gender		<.001		<.001		.296
Male	43.2±20.0		40.9±20.0		37.4±18.9	
Female	53.9±21.4		49.4±21.1		38.8±18.9	
Age		<.001		<.001		<.001
<30	56.7±22.9		55.0±23.0		42.8±20.1	
30~39	54.7±21.2		49.9±20.6		39.4±18.8	
40~49	48.7±21.5		44.7±20.5		37.3±17.8	
≧50	42.8±17.0		37.6±17.4		31.8±18.1	
Educational level		<.05		<.05		.353
High school	55.7±21.9		50.5±21.9		40.8±18.9	
College/university	51.0±21.6		47.3±21.1		38.3±18.8	
Graduate school	58.0±21.2		52.2±21.9		38.6±19.3	
Marital status		.299		.078		<.05
Single	52.8±21.9		49.3±21.6		39.9±18.9	
Married	51.6±21.3		47.2±20.9		37.7±18.8	
Profession		<.001		<.001		<.001
Physician	43.3±18.6		41.5±19.0		38.6±16.7	
Physician assistant	58.7±20.7		54.7±21.9		41.1±17.7	
Nurse	60.1±20.8		55.8±21.1		42.9±19.1	
Medical technician	43.9±19.1		39.5±17.4		32.9±18.4	
Administrative staff	45.5±20.2		41.5±19.2		34.6±17.9	
Work hours (weekly)		<.001		<.001		<.001
Normal (≦44 hours)	49.6±20.7		40.1±19.0		34.3±18.2	
Overtime (>44 hours)	60.4±22.3		52.3±21.1		40.9±18.8	
Work shifts		<.001		<.001		<.001
Fixed shift	48.4±20.8		44.3±20.2		36.7±18.6	
In shift	55.8±21.7		51.9±21.6		40.5±18.9	
Job strain		<.001		<.001		<.001
Low	42.7±18.7		38.6±18.5		34.5±16.9	

Passive	46.3±18.1		42.5±16.9		34.3±16.7	
Active	61.9±20.6		55.6±19.6		42.3±19.3	
High	67.9±19.3		65.4±20.1		48.7±20.2	
Over-commitment		<.001		<.001		<.001
Never/seldom (0-25)	33.8±17.4		29.9±18.2		25.7±15.5	
Sometimes (26~50)	46.1±17.9		42.3±17.0		35.6±16.3	
Often/always (≧51)	65.8±19.8		61.4±20.2		46.5±19.9	
Social support		<.001		<.001		<.010
Low (<24)	55.9±21.5		53.0±21.6		40.4±20.1	
High (≧24)	49.6±21.2		45.0±20.4		37.5±18.1	

Table 3

Multiple regression analysis of factors associated with work-related burnout (n=1329)

Variables	Model 1 β (95%C.I.)	Model 2 β (95%C.I.)	Model 3 β (95%C.I.)	Model 4 β (95%C.I.)
Gender				
Male	0	0	0	0
Female	5.2(2.1~8.2)**	5.4(2.4~8.4)***	0.6(-2.9~4.0)	.849(-1.9~3.6)
Age				
≧50	0	0	0	0
40~49	6.1(2.0~10.1)**	6.1(2.1~10.0)**	4.6(0.7~8.6)*	3.8(0.7~7.0)*
30~39	10.3(6.4~14.2)***	8.8(4.9~12.6)***	6.1(2.2~10.0)**	6.5(3.4~9.7)***
<30	15.3(10.7~19.9)***	12.6(8.1~17.2)***	9.1(4.5~13.7)***	10.3(6.5~13.9)***
Educational level				
High school	0	0	0	0
College/university	-2.0(-5.8~1.7)	-2.9(-6.5~0.7)	-1.7(-5.2~1.9)	-0.8(-3.6~2.1)
Graduate school	2.2(-3.3~7.7)	0.7(-4.7~6.1)	1.3(-3.9~6.7)	0.4(-3.8~4.6)
Marital status				
Married	0	0	0	0
Single	0.8(-1.6~3.1)	1.0(-1.2~3.3)	1.4(-0.8~3.6)	0.2(-1.6~1.9)
Work hours (weekly)				
Normal (≦44hours)		0	0	0
Overtime (>44hours)		9.7(7.1~12.3)***	7.8(5.2~10.5)***	2.9(0.7~5.1)**
Work shift				
Fixed shift		0	0	0
In shift		4.8(2.6~7.1)***	1.9(-0.5~4.3)	0.7(-1.2~2.7)
Profession				
Medical technician			0	0
Administrative staff			3.7(0.3~7.0)*	1.9(-0.7~4.6)
Physician			1.4(-3.8~6.7)	4.1(-0.1~8.3)
Physician assistant			12.7(7.3~18.2)***	6.6(2.2~11.0)**
Nurse			12.9(9.6~16.3)***	7.7(4.9~10.4)***
Job strain				
Low				0

Passive				1.6(-0.6~3.9)
Active				7.5(4.8~10.1)***
High				16.1(13.4~18.7)***
Over-commitment				
Never/seldom (0~25)				0
Sometimes (26~50)				10.5(7.6~13.4)***
Often/Always (≧51)				24.9(21.8~28.0)***
Social support				
High (≧24)				0
Low (<24)				6.4(4.5~8.2)***
R^2	.064	.116	.160	.461
Adjust R^2	.059	.110	.152	.453

*p <0.05, **p <0.01, ***p <0.001

Model 1 adjusted for gender, age, education, and marriage.

Model 2 adjusted for variables of model 1 with additional adjustment for work hours and work shift.

Model 3 adjusted for variables of Model 2 and profession.

Model 4 adjusted for variables of Model 3 with additional adjustment for job strain, over-commitment, and social support.

Table 4

Distribution of age, gender, job stressors and burnout among medical professions (N=1329)

Variables	Physician	Physician assistant	Nurse	Medical technician	Administrators	p-value
	n=101	n=68	n=570	n=216	n=374	
High burnout (%)						
Personal burnout (≧50)	41.6	69.1	73.2	42.6	45.5	<.001
Work-related burnout (≧50)	38.6	61.8	66.0	31.9	36.1	<.001
Client-related burnout (≧50)	36.6	33.8	43.3	22.2	26.2	<.001
Job stressor						
High strain (%)	2.0	27.2	27.9	14.4	14.7	<.001
Over-commitment (often, %)	30.7	44.1	43.7	24.1	31.8	<.001
Social support (low, %)	28.7	60.3	37.0	37.0	38.2	<.001
Work overtime (>44hours, %)	48.5	44.1	29.1	9.7	9.6	<.001
Work shift (in shift, %)	46.1	29.4	74.0	38.0	21.1	<.001
Age (mean±SD)	45.3±7.5	38.4±4.8	33.9±6.5	37.9±8.1	42.3±8.6	<.001
Gender (female, %)	16.8	91.2	99.5	75.0	78.3	<.001

Job Stress and Burnout in Hospital Employees: Comparisons of Different Medical Professions in a Regional Hospital in Taiwan

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ABSTRACT

Objectives: To explore the prevalence and associated factors of burnout among five different medical professions in a regional teaching hospital.

Design: Cross-sectional study.

Setting: Hospital-based survey.

Participants: A total of 1,329 medical professionals were recruited in a regional hospital with a response rate of 89%. These voluntary participants included 101 physicians, 68 physician assistants, 570 nurses, 216 medical technicians and 374 administrative staff.

Primary and secondary outcome measures: Demographic data included gender, age, level of education, marital status, and work situations, such as position, work hours, work shifts, were obtained from electric questionnaire. Job strain and burnout were measured by two validated questionnaires, the Chinese version of the Job Content Questionnaire and the Copenhagen Burnout Inventory.

Results: Among the five medical professions, the prevalence of high work-related burnout from highest to lowest was nurses (66%), physician assistants (61.8%), physicians (38.6%), administrative staff (36.1%) and medical technicians (31.9%), respectively. Hierarchical regression analysis indicated that job strain, over-commitment and low social support explained the most variance (32.6%) of burnout.

Conclusions: Physician assistant is an emerging high burnout group; their severity is similar to nurses and far more than physicians, administrative staff and medical technicians. These findings may contribute to the development of feasible strategies to reduce the stress which results in the burnout currently plaguing most hospitals in Taiwan.

Keyword: Job strain, Burnout, Medical professions

ARTICLE SUMMARY

Article focus

- To study the prevalence and correlating factors of burnout in different medical professionals who work together as a team in hospitals.

Key messages

- The study shows that the prevalence of high work-related burnout from highest to lowest was nurses, physician assistants, physicians, administrative staff and medical technicians.
- The study also indicates that age, work hours, job strain, over-commitment and social support were significantly related to burnout.

Strengths and limitations of this study

- This is the first report to compare burnout conditions among most of the medical professions in a hospital setting; large sample size and high response rate also strengthen the power of this study.
- Stressful life events, work-family conflicts and copying style of stress were not analyzed in this study.

Introduction

Medical practice is stressful. This is because medical personnel must respond to the needs of patients and families very quickly. However, medical knowledge and procedures usually include limitations and uncertainties. Any medical errors or mistakes may be costly, may be harmful to a patient's life, and are sometimes irreversible. Moreover, night work, shift work and long work hours are also very common in medical professions.

A great deal of research has indicated that long term exposure to job-related stress can lead to burnout.[1, 2] Freudenberger[3] first used the term "burnout" to describe the gradual emotional depletion, loss of motivation, and reduced commitment among volunteers who worked for drug abuser. After three decades, burnout has been defined as a psychological syndrome that may emerge when employees are exposed to a stressful working environment with high job demands and low resources.[4, 5] At the outset, burnout was reported most predominantly among human service workers. In the modern society, job stress and burnout are important issues for health care professionals. Burnout not only endangers their health and well-being, but also is associated with higher medical errors and suboptimal quality of care.[6-8]

There has been a lot of research on burnout in nurses, presumably because of the intense nature of their contact with patients or clients. Gray-Toft and Anderson[9] have

indicated seven fundamental stressors among nursing staff. These included the death and suffering of patients, conflict with physicians, inadequate training, lack of social support, conflicts with other nurses, excessive workload, and uncertainty about a treatment given. Similarly, a high prevalence of burnout among physicians has also been reported from various countries, for different specialists.[10-13] The potential sources of physician burnout are time pressure, delayed gratification, limited control and a loss of autonomy, conflict between career and family, feelings of isolation, as well as research and teaching activities.[8,14]

Although many studies have discussed the stress and burnout situation for physicians and nurses, there has been no research on other medical professions, such as physician assistants, medical technicians and administrative staff, who work together as a team in hospitals. In particular, physician assistants have been recruited in most hospitals in Taiwan. They work together with physicians for direct patient care but their stress and burnout situation have not been reported yet.

This study is aimed at an investigation and comparison of the prevalence of job stress and burnout among different medical professions within a hospital setting. Another aim is to explore the associated factors that contribute to burnout across these professions. We hope these findings can facilitate the development of effective strategies of stress reduction programs in the hospitals.

Methods

Participants and study design

The medical professionals used as the sample in this study were recruited from a regional teaching hospital in Tainan, Taiwan. The five medical professions included in the survey were doctor, nurse, physician assistant, medical technician, and administrative staff. After reading the informed consent, all the voluntary participants completed an electronic questionnaire on the Training and Management System of the hospital from the first day of February through the end of March, 2012. Finally, 1,329 participants finished the questionnaire, and the response rate was 89%. The study was approved by the Ethics Review Board of the regional hospital.

Questionnaire

The questionnaire used in the study included socio-demographic information, working conditions, level of burnout and job stress, lifestyle behaviors, as well as medical history. Socio-demographic information included gender, age, educational level, and marital status. Working conditions included length of employment at current position, working hours per week, whether or not participants were doing shift work. Lifestyle factors included hours of sleep every night, healthy diet per week (≧ 5 servings of vegetable and fruits per day), time spent on physical activities per week,

and smoking status.

Burnout

The newly developed Copenhagen Burnout Inventory (CBI) by Kristensen, et al. [15] is a more straightforward measurement of burnout in the population of medical professionals as compared to the standard Maslach Burnout Inventory (MBI).[16] The CBI assesses burnout status using three dimensions: personal burnout, work-related burnout, and client-related burnout.

In this research, the burnout status was assessed by a Chinese version of the Copenhagen Burnout Inventory (C-CBI) which was constructed based on the CBI with good validity and reliability.[17, 18] The C-CBI consists of 16 items: personal burnout accounts for 5 items, work-related burnout accounts for 5 items, and client-related burnout accounts for 6 items. All items used a Likert-type, five-response category scale. The responses were re-scaled to a 0–100 metric. In this survey, the questionnaire had a Cronbach's α coefficient for each dimension of 0.93, 0.93, and 0.92, respectively. A high burnout score $\geqq$ 50 indicates high burnout in the analysis.

Job stress

We also included the qualified Chinese version of the Job Content Questionnaire (C-JCQ), which was derived from Karasek's demand-control-support model to measure job strain, because this model has been considered one of the

dominant tools for measuring job stress.[19] This model was highly associated with hypertension and intima-media thickness of carotid artery[20-22] and was also correlated well to coronary heart disease in a recent published paper.[23] A total of 25 items are included, with psychological work demands, 9 items; job control, 8 items; supervisor support, 4 items; and coworker support, 4 items. Each item of the inventory was measured on a 4-point scale (strongly agree to strongly disagree). A subscale of "over-commitment" specified by Siegrist was also included in our questionnaire.[24, 25] The measurement of over-commitment was based on 5 items on a 5 point Likert scale. The Cronbach's α coefficient for the dimension of demand, control, supports and over-commitment in this study were 0.47, 0.64, 0.87, and 0.83, respectively.

Statistical analysis:

Demographic data including gender, age, level of education, marital status, and work situations such as position, work hours, work shifts were recorded as number and percentages. One-way ANOVA (analysis of variance) was used for the analysis of burnout according to the socio-demographic information, profession, work conditions and level of job strain. Correlation analysis was performed to analyze the relationships among independent variables influencing burnout in order to avoid a multi-collinearity problem in the multiple regression analysis (not shown in the result). Multiple regression analysis for different models was performed to identify the factors

influencing work-related burnout. All calculations were performed using a software SPSS ver. 17, with the level of significance set at $p < 0.05$.

Results

Characteristics of the participants

The socio-demographic factors, job characteristics and medical profession information are summarized in Table 1. The participants were female dominant (82.8%). The majority age group was 30-39 years, and the mean age across subjects was 38.3 years. Most medical professionals were married (62.5%) and graduated with a 4-year university degree (83.1%) at the time of study. More than half of the participants work overtime routinely, and nearly half of the medical professions worked in shifts.

Factors associated with burnout

Table 2 shows that females had significantly higher burnout scores than males in personal and work-related burnout but not in the client-related burnout. Older staff had significantly lower burnout scores than younger staff on the three dimensions of burnout. Participants who graduated from a college had lower burnout scores than those who graduated from high school or graduate school. Among medical professions, nurses and physician assistants had the top two highest burnout scores

among the three dimensions. With regard to job strain, active and high strain perception was characterized by a significantly higher degree of burnout than was the case for those who perceived their level of strain as passive or low. Frequency of over-commitment was positively correlated with the score of all three dimensions of burnout. Finally, lower social support was negatively correlated with the three burnout scores.

Predictors of worked-related burnout

The results of multiple regression analysis of predicting variables to work-related burnout are shown in Table 3. Model 1 demonstrated that gender and age, but not level of education, or marital status had a significantly correlation to burnout. In Model 2, working overtime and working in shifts had additional effects with regard to burnout. When putting on medical professions into Model 3, it was indicated that nurses and physician assistants had significantly higher burnout than the other three medical professions, and gender effects were thus insignificant. In the full model (Model 4), those who perceived with high or active job strain had much higher burnout than those with low and passive strain. Professionals who sometimes/often over-commit were demonstrated to have higher levels of burnout than those who indicated that they never or seldom over-commit. Finally, professionals with low social support had significantly higher burnout. Among these factors, job strain,

over-commitment, and social support demonstrated remarkable association with work-related burnout, which could explain 30.1% of variance in burnout.

Burnout and job stressors among medical professions

In Table 4, nurses are shown to have the highest prevalence of high burnout among medical professions. The next highest were the physician assistants, with a severity of burnout very similar to that of nurses. However, physicians, medical technicians and administrative staff had similar burnout conditions on the personal and work related dimensions, but physicians had more severity of client-related burnout than the other professions, with the exception of nurses.

Compared with the other professions, nurses as a group had the characteristics of youngest age, were nearly females (99.5%), most engaged in shift work (74%), as well as had the highest percentage (27.9%) perceiving high strain. Physician assistants as a group had the highest over-commitment (44.1%) and lowest support (60.3%). They were also characterized as having a high percentage of females (91.2%), long work hours, and the second highest percentage (27.2%) experiencing high strain. Physicians as a group had the features of being the oldest on average and had the highest percentage of longer work hours (48.5%) but very few perceived high strain (2.0%). Medical technicians and administrative staff had a similar percentage of

female members, social support, longer work hours, and those testing for high strain (14.4%, 14.7%).

Discussion

This study investigated the prevalence of burnout among different medical professions and examined the associated factors related to burnout. Our findings showed that being young, working overtime, being a nurse and physician assistants, engaged in a job with high strain, frequent over-commitment and low social support were associated with high burnout. Above all, the three variables of job strain, over-commitment and lack of social support explained most of the variance related to burnout.

To our knowledge, this is the first report to compare most of the medical professions in a hospital setting. The advantages of large sample size and high response rate also strengthen the power of this study. The results indicated that nurses have the highest burnout scores as compared to the other medical professions, which is consistent with a previous report.[26] The mean burnout score and percentage of high burnout in nurses (60.1 and 73.2% in this study) was shown to be much higher than other studies using similar instruments.[8, 15, 16, 27, 28] The primary cause of stress for hospital staff came from the preparation of hospital accreditation, and the second

cause of stress was the threat of medical malpractice lawsuits.[26] This reason may partially explain the high burnout in Taiwan's medical professionals. In addition, Heinen, et al.[29] reported that high burnout is consistently associated with nurse's intention to leave their profession. This seems to be a vicious cycle. Therefore, Taiwan's nurses have a high workload and lack of adequate staffing for periods of times which they describe as being "trapped in hell".[30]

The second group most susceptible to burnout is physician assistants (also called clinical nurse specialist after 2000).[31] Their burnout scores and prevalence of high burnout were very close to nurses. The possible reason for this is that physician assistants have been recruited due to a shortage of resident physicians in most of Taiwan's hospitals since 1994.[31] Most of them had graduated from college or above, had 2-4 years of clinical experience and had received a half-year of additional training. Their routine work is to assist attending physicians to care for patients and complete medical records. Most of the time, physician assistants may face emergent and critical conditions of patients and make immediate responses. This is really a big challenge in their work. In our analysis, physician assistants had a higher percentage of related factors toward burnout than physicians had, which included being female, of younger age, experiencing high strain, over-commitment and low social support.

The unanticipated result in this study is that the burnout scores of physicians

were very close to those of medical technicians and administrative staff. The mean burnout score and prevalence of high burnout in physicians in this study were 43.3 and 41.6%. These data are very close to scores from Mongolian physicians but higher than those found in Danish physicians, Australian dentists and other occupations in Taiwan.[15, 16, 26, 32, 33]

Although this study has some strength, there are still several limitations that need to be addressed. First, our participants were from a single regional hospital; therefore, it is not possible to generalize the conclusions for medical professions across the whole of Taiwan's hospitals. Therefore, the design for further study can expand to include more institutions. Second, stressful life events and work-family conflicts, which may affect the outcome of burnout, as found in other studies, were not examined in this research. Finally, this study was conducted with a cross-sectional design; therefore, the limitation of weak causal inference is inherent. A longitudinal follow up the employee's stressor and burnout condition are necessary to improve these relationships in the future.

We conclude that nurses and physician assistants suffered from the highest burnout as compared to physicians, administrative staff, and medical technicians in the hospital setting selected for this study. Also, a job with high strain, frequent feelings of over-commitment as well as working without superintendent and coworker

support resulted in the highest percentages of burnout. The above findings may facilitate the development of feasible and rational strategies to design and implement stress reduction programs in hospitals.

For example, the results showed burnout to be higher in younger individuals, as well as in those who work overtime, perceive high strain, and in those who frequently over-commit or receive low social support. Therefore, we suggest that the target group of stress reduction programs should focus on younger professionals first and the intervention strategies must cover individual/group and environmental levels. The former includes communication skill training, stress and time management, and senior-junior support groups, etc. The later includes suitable worksheet, reasonable welfare, and healthy working environment, etc.

Conflict of interest

The authors declare that there is no conflict of interest.

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Table 1

Characteristics of participants (N=1329)

Factors	N	%
Gender		
Male	228	17.2
Female	1101	82.8
Age		
<30	209	15.7
30~39	602	45.3
40~49	378	28.4
≧50	139	10.5
Education		
High school	135	10.2
College/university	1105	83.1
Graduate school	89	6.7
Marital Status		
Single	499	37.5
Married	830	62.5
Profession		
Physician	101	7.6
Physician assistant	68	5.1
Nurse	570	42.9
Medical technician	216	16.3
Administrative staff	374	28.1
Work hours(weekly)		
Normal (≦44 hours)	472	35.5
Overtime (>44 hours)	857	64.5
Work shifts		
No	684	51.5
Yes	645	48.5

Table 2

Analysis of burnout score according to socio-demographic, profession, and job stressors (n=1329)

Variable	Personal burnout		Work-related burnout		Client-related burnout	
	Mean±SD	*p-value*	Mean±SD	*p-value*	Mean±SD	*p-value*
Gender		<.001		<.001		.296
Male	43.2±20.0		40.9±20.0		37.4±18.9	
Female	53.9±21.4		49.4±21.1		38.8±18.9	
Age		<.001		<.001		<.001
<30	56.7±22.9		55.0±23.0		42.8±20.1	
30~39	54.7±21.2		49.9±20.6		39.4±18.8	
40~49	48.7±21.5		44.7±20.5		37.3±17.8	
≧50	42.8±17.0		37.6±17.4		31.8±18.1	
Educational level		<.05		<.05		.353
High school	55.7±21.9		50.5±21.9		40.8±18.9	
College/university	51.0±21.6		47.3±21.1		38.3±18.8	
Graduate school	58.0±21.2		52.2±21.9		38.6±19.3	
Marital status		.299		.078		<.05
Single	52.8±21.9		49.3±21.6		39.9±18.9	
Married	51.6±21.3		47.2±20.9		37.7±18.8	
Profession		<.001		<.001		<.001
Physician	43.3±18.6		41.5±19.0		38.6±16.7	
Physician assistant	58.7±20.7		54.7±21.9		41.1±17.7	
Nurse	60.1±20.8		55.8±21.1		42.9±19.1	
Medical technician	43.9±19.1		39.5±17.4		32.9±18.4	
Administrative staff	45.5±20.2		41.5±19.2		34.6±17.9	
Work hours (weekly)		<.001		<.001		<.001
Normal (≦44 hours)	49.6±20.7		40.1±19.0		34.3±18.2	
Overtime (>44 hours)	60.4±22.3		52.3±21.1		40.9±18.8	
Work shifts		<.001		<.001		<.001
Fixed shift	48.4±20.8		44.3±20.2		36.7±18.6	
In shift	55.8±21.7		51.9±21.6		40.5±18.9	
Job strain		<.001		<.001		<.001
Low	42.7±18.7		38.6±18.5		34.5±16.9	

Passive	46.3±18.1		42.5±16.9		34.3±16.7	
Active	61.9±20.6		55.6±19.6		42.3±19.3	
High	67.9±19.3		65.4±20.1		48.7±20.2	
Over-commitment		<.001		<.001		<.001
Never/seldom (0-25)	33.8±17.4		29.9±18.2		25.7±15.5	
Sometimes (26~50)	46.1±17.9		42.3±17.0		35.6±16.3	
Often/always (≧51)	65.8±19.8		61.4±20.2		46.5±19.9	
Social support		<.001		<.001		<.010
Low (<24)	55.9±21.5		53.0±21.6		40.4±20.1	
High (≧24)	49.6±21.2		45.0±20.4		37.5±18.1	

Table 3

Multiple regression analysis of factors associated with work-related burnout (n=1329)

Variables	Model 1 β (95%C.I.)	Model 2 β (95%C.I.)	Model 3 β (95%C.I.)	Model 4 β (95%C.I.)
Gender				
Male	0	0	0	0
Female	5.2(2.1~8.2)**	5.4(2.4~8.4)***	0.6(-2.9~4.0)	.849(-1.9~3.6)
Age				
≧50	0	0	0	0
40~49	6.1(2.0~10.1)**	6.1(2.1~10.0)**	4.6(0.7~8.6)*	3.8(0.7~7.0)*
30~39	10.3(6.4~14.2)***	8.8(4.9~12.6)***	6.1(2.2~10.0)**	6.5(3.4~9.7)***
<30	15.3(10.7~19.9)***	12.6(8.1~17.2)***	9.1(4.5~13.7)***	10.3(6.5~13.9)***
Educational level				
High school	0	0	0	0
College/university	-2.0(-5.8~1.7)	-2.9(-6.5~0.7)	-1.7(-5.2~1.9)	-0.8(-3.6~2.1)
Graduate school	2.2(-3.3~7.7)	0.7(-4.7~6.1)	1.3(-3.9~6.7)	0.4(-3.8~4.6)
Marital status				
Married	0	0	0	0
Single	0.8(-1.6~3.1)	1.0(-1.2~3.3)	1.4(-0.8~3.6)	0.2(-1.6~1.9)
Work hours (weekly)				
Normal (≦44hours)		0	0	0
Overtime (>44hours)		9.7(7.1~12.3)***	7.8(5.2~10.5)***	2.9(0.7~5.1)**
Work shift				
Fixed shift		0	0	0
In shift		4.8(2.6~7.1)***	1.9(-0.5~4.3)	0.7(-1.2~2.7)
Profession				
Medical technician			0	0
Administrative staff			3.7(0.3~7.0)*	1.9(-0.7~4.6)
Physician			1.4(-3.8~6.7)	4.1(-0.1~8.3)
Physician assistant			12.7(7.3~18.2)***	6.6(2.2~11.0)**
Nurse			12.9(9.6~16.3)***	7.7(4.9~10.4)***
Job strain				
Low				0

Passive				1.6(-0.6~3.9)
Active				7.5(4.8~10.1)***
High				16.1(13.4~18.7)***
Over-commitment				
Never/seldom (0~25)				0
Sometimes (26~50)				10.5(7.6~13.4)***
Often/Always (≧51)				24.9(21.8~28.0)***
Social support				
High (≧24)				0
Low (<24)				6.4(4.5~8.2)***
R^2	.064	.116	.160	.461
Adjust R^2	.059	.110	.152	.453

*p <0.05, **p <0.01, ***p <0.001

Model 1 adjusted for gender, age, education, and marriage.

Model 2 adjusted for variables of model 1 with additional adjustment for work hours and work shift.

Model 3 adjusted for variables of Model 2 and profession.

Model 4 adjusted for variables of Model 3 with additional adjustment for job strain, over-commitment, and social support.

Table 4

Distribution of age, gender, job stressors and burnout among medical professions (N=1329)

Variables	Physician	Physician assistant	Nurse	Medical technician	Administrators	p-value
	n=101	n=68	n=570	n=216	n=374	
High burnout (%)						
Personal burnout (≧50)	41.6	69.1	73.2	42.6	45.5	<.001
Work-related burnout (≧50)	38.6	61.8	66.0	31.9	36.1	<.001
Client-related burnout (≧50)	36.6	33.8	43.3	22.2	26.2	<.001
Job stressor						
High strain (%)	2.0	27.2	27.9	14.4	14.7	<.001
Over-commitment (often, %)	30.7	44.1	43.7	24.1	31.8	<.001
Social support (low, %)	28.7	60.3	37.0	37.0	38.2	<.001
Work overtime (>44hours, %)	48.5	44.1	29.1	9.7	9.6	<.001
Work shift (in shift, %)	46.1	29.4	74.0	38.0	21.1	<.001
Age (mean±SD)	45.3±7.5	38.4±4.8	33.9±6.5	37.9±8.1	42.3±8.6	<.001
Gender (female, %)	16.8	91.2	99.5	75.0	78.3	<.001